A Case Study of Online Learning Tools to Mitigate the Impact of Covid-19 Pandemic on Education System

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Abstract - Pandemics are cruel and devastating. No business, area and affair can be left unaffected or least affected. The entire world is shaken by a pandemic caused by new virus covid-19 since December-2019. This paper describes the broad impact of COVID-19 on educational systems and how the entire learning system is perturbed by the preventive steps taken to curb the spread of the pandemic. Moreover, the evolution of online tools as to continue the teaching learning process has also been illustrated. The study involves use of MOOCS, Moodle and online teaching platforms while conducting academic activities in our Institute from March-June 2020.

Keywords: COVID-19, Pandemic, Moodle-LMS, MOOCS, Google Meet, Google Classroom.

I. INTRODUCTION

COVID-19 raised an unprecedented circumstanced before mankind that leads decisions for taking preventive measures to curb the spread of the pandemic amongst the human beings. Administrative interventions have evolved with measures like social distance, quarantine and isolation prompting closure of almost every functionary around the world.

COVID-19 or novel coronavirus (2019-nCoV) is a highly contagious disease [1]. According to Bian et al. the coronavirus belongs to Severe Acute Respiratory Syndrome (SARS) and is as fatal as SARS virus [2]. How it spreads? The virus transmits through droplets in the air, by getting in touch with surfaces and materials infected by person suffering from COVID-19. Elderly and children's up to the age of 5 are the ones who can easily get infected and affected. Bender reported there is no direct or indirect medical treatment available to treat the disease therefore the entire mankind is prone to its dire consequences [1]. The only way to get away from COVID-19 is to take precautions and avoid coming in contact with infectious materials and infected humans.

Closure of academic institutions has raised various barriers in the further development of the students. Suspension of classes and relevant academic engagements have paused the teaching learning processes across the entire nation. The closure has been applied to primary, secondary, tertiary and higher studies organizations which have devastated the whole infrastructure of the education system. Temporary closure of schools and institutes across nation in order to curb the furious corona virus spread has generated crucial challenges for conducting following.
a) Academic Classes
b) Practical engagements
c) Internship programs
d) Evaluation and assessments
e) Examinations
f) Admission processes
g) Job Offers
h) Faculty Development

Unfortunately, no direct and effective solutionsseem to available to contain the outbreak of the disease, consequently the closure of educational organizations will have short term and long-term implications upon learning of over 250 million learners across India. It will also attract dire social and economical consequences.

Although the availability of internet tools and technology has offered various direct-indirect instruments of communications to catalyze the learning process, but the distribution of infrastructure for the same across countries and nation differs.

In this paper, our aim is to explore following:
a) To study the effects of covid-19 pandemic on educational systems.
b) What are the issues and challenges before educational system during pandemic?
c) What are the methods and materials used for dispensing education amongst the students and learners?
d) Study of online tools during COVID-19 Pandemic.
e) How effective the use of tools like LMS, MOOCS and Google-Meet in particular for dispensing the teaching learning processes.

In the era of ICT (Information Communication Technology) and with ample availability of open technologies Universities and Institutes can plan their academic activities in a way to evolve a better sustainable learning model to bear such unprecedented situation ever.

Thus, the main contribution of this article is to document the research evidences on how COVID-19 has changed the working of educational organizations across the world. It also provides an analytical study of online tools and materials used in conducting academic activities for learners. Consequently, the research can be useful for peer educational institutions in dissemination of knowledge and skills un-interruptedly.

II. RELATED HISTROY

Many researchers have been working so far related to COVID-19 across the globe and are mostly in the field of medical [3] [4] [5]. There are very few researches are done pertinent to the impact of COVID-19 on the field of higher education although there are many literatures available on the effect of SARS on educational systems [6] [7] [8].

Social distancing and home isolation are effectively used to control pandemic outbreaksthe strategy of implementing such preventive measures are shutdown of essential and non-essential services and closure of educational organizations in one amongst them [9].

According to Frieden T. Outbreaks in history had been controlled by closing of educational systems around the world with flexibility [10]. The concept of educational institutions closure Is not new, there have been models showing that the speed of contagious disease spread can be delayed by closing schools, colleges and universities, though the effectiveness depends upon how the social distancing is maintained outside educational organizations [11] [12]. It was also observed that regions where such interventions had imposed quite early were able to delay in achieving the highest level in mortality rate.

III. MATERIALS AND ONLINE LEARNING TOOLS

There are several online tools are available for online teaching and learning process, in this paper we used Moodle-LMS, IIT Spoken Tutorial and Google-Meet for session Jan-June 2020.

Moodle-LMS
Moodle is the program that provides an interface to the teachers and students that extends an online classroom arrangement. It is an open source learning management system (LMS) used for distance learning and related e-learning activities in academic institutions. It can be customized and used to create websites for educators to achieve academic goals developed on pedagogical principles. The utility allows teachers to create subject courses, assignments and quizzes along with effective evaluation of the students.

Google Meet
It is a video conferencing utility developed by Google to replace Goolge Hangouts in 2019 [13]. Earlier this, the application was formally launched in 2017 supporting 30

participants as an enterprise version of Google Hangout having features like facility to join conference meeting anytime, security password, Google calendar integration for single click calls with many more utility features. In view of COVID-19 the Google has opened all the features which were limited for an enterprise account. Subsequently due to corona virus effect its use has grown up to 30 times since Jan 2020 [14].

Google Classroom
Google introduced classroom service for its G Suit education program member in May 2014, later was made available for public use in August 2014 [15]. It is a free online service for creation, distribution and grading of teaching learning material exchanged between educators and learners. Google classroom is integrated with Google drive, sheets and docs along with Gmail helping institutions for effective file sharing. Learners invited to the classrooms using their mail identifications directly.

In this paper for the study of above e-learning platforms have been used during January 2020 to June 2020. The study has been carried out on the logs collected from the server of Acropolis Institute of Technology and Research Indore India wherein these systems are being used for online teaching learning processes. To evaluate the results we used the records of around 480 students of Information Technology who use these platforms remotely to attend online classes and submit the assignment and quizzes during the lockdown period or otherwise.

Moodle-LMS is configured on Linux platform, courses are created semester wise, course coordinators (Faculty) were allocated to each course. The course created was as per the units or sections categories on the basis of topics so that assignment and quizzes can be assigned to learners for learning assessment. The course coordinator (admin user of the course) defines the submission deadlines for the assignment and users (students) need to submit the assignment by uploading the required files.

Course wise Google meetings were organized for conduction of online classes and students were asked to join the session delivered by educators for one hour. The attendance of the meeting was recorded digitally using the Google-Meet utility for further record.

IV. RESULT AND DISCUSSION

Table 1 demonstrates the statistics of courses created and the learners enrolled across the courses since January-December 2018, the year when Moodle-LMS was first configured in the Institute. It is to be noted and understood, the number of courses created and students enrolled for session 2020 has been considered up to June 2020 only (i.e. record of six months only) compared to previous two years (i.e. record of 12 months). It is visible from figure 1 (a & b) that maximum enrollment falls across electronics communication and information technology disciplines in relation other disciplines,

because the courses needs physical interaction with equipments to get the concepts and fundamentals clarified.

Table 1. Course created and Enrolment statistics

No.	Sessions/Year	Course Created	Course Enrollment
1	Jan-Dec 2018	86	3822
2	Jan-Dec 2019	389	23128
3	Up to June 2020	193	10522
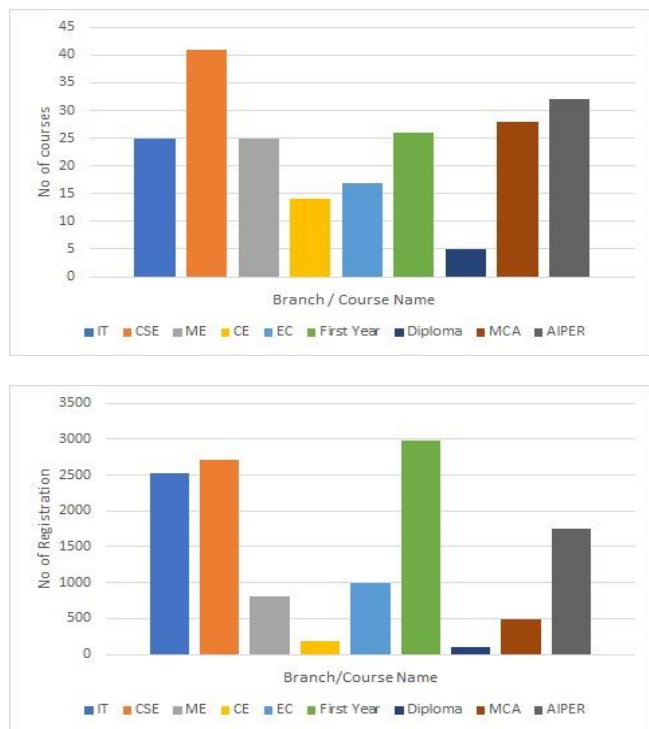
Figure 1 (a) Number of Courses Created on Moodle LMS (b) Students Enrollment in Various Courses

Illustratively figure 2 shows that Moodle is quite effective and efficient in conducting online quizzes and assignments. It is visible from the graph that out of 132 students 124 students have scored above 60% and remaining 8 students are below 60%. Thus it provides an analytical report of students who submitted the assignments for respective course. It will help the educator to analyze the learning curve of the learner and accordingly he can plan his sessions further to comprehend the difficult to learn topics.
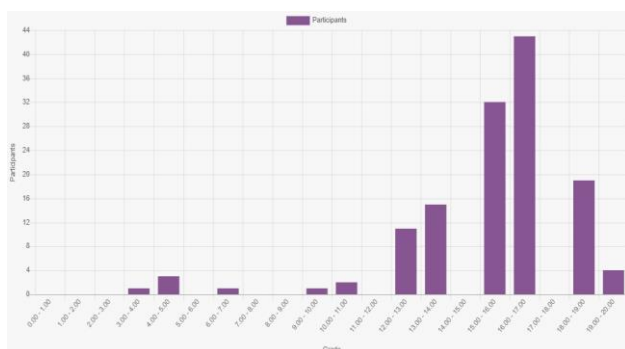

Figure 2 Evaluation and Assessment of Assignments Submitted on LMS

In figure 3a it is clearly observed that educators and students have used Google classroom more from April 2020 to May 2020 which is actually the lockdown period imposed to prevent the spread of COVID-19.In this duration both users has used the platform for posting and exchanging materials and files pertaining to the subject. This can also be visible in figure 3b, where in the same duration educators and learner are found more active.
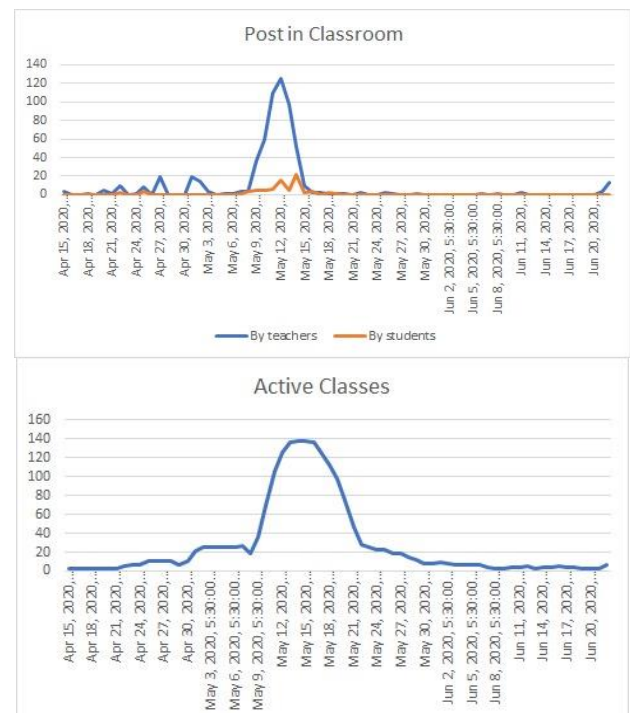

Figure 3 a) Google Classroom Interactions b) Number of Active Classes during COVID-19 lockdown

Educators and learners need to improve their skill-set in various open source tools and technology to meet the requirement of the world of work. Certifications in technology of interest will provide additional edge for acquiring jobs in interested domains. It is justifiable from figure 4 that learners have attended such courses of their interest in Jan-June 2020 compared to June-Dec 2019. The graph demonstrates that students have acquired more technical certificates in the period of lockdown than before [16].
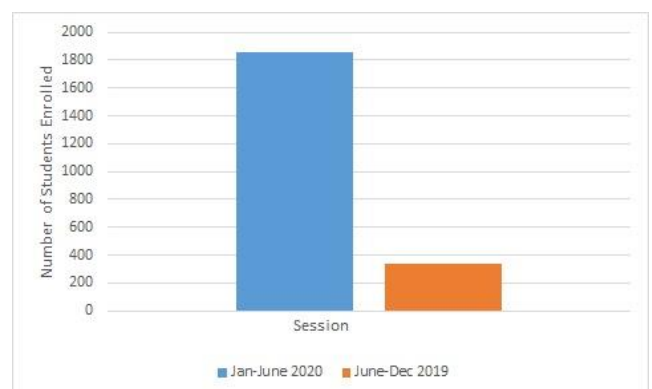

Figure 4 Student Enrollment for Free and Open Source Tools

V. CONCLUSION

In this paper we have studied about the effects of COVID-19 pandemic on educational system and it is observed that the impact of elongated lockdown has disrupted the teaching learning process of the educational system. Moreover, academic interaction between students and professors is no longer possible using a traditional classroom or otherwise. Educational institutions have sought adhoc medium for conducting virtual classroom using open online tools as to continue the academic activities. In our study, to effectively and efficiently continue the academic activities, Moodle-LMS, Google-Meet and Google- Classroom are found fairly efficient. Using these tools, we are able to allocate time and resources more effectively. Moreover, these e-learning platforms has provided more flexibilities in assessing and evaluating the students with better accuracy to gather information pertaining to topics, which needs more emphasis for better comprehension. The deadline imposed stimulates the students to manage and complete the assignment with creativity and submit it within stipulated time.

The study concludes that e-learning platforms can be a remote solution to aid the traditional teaching and learning process in any educational institutions with certain limitations to be improved. Future enhancements in these tools from the aspect of students preferences and choices to divide them in homogeneous groups can be explored for better peer learning, which is quite impossible remotely.

REFERENCES

[1] L. Bender, "Key Messages and Actions for COVID-19 Prevention and Control in Schools", Retrieved from https://www.unicef.org/romania/documents/key-messages-and-actions-covid-19-prevention-and-control-schools, 2020.

[2] L. Meng, F. Hua, Z. Bian, "Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine", Journal of Dental Research, 2020.

[3] A.S. Abdulamir, R.R. Hafidh, "The Possible Immunological Pathways for the Variable Immunopathogenesis of COVID-19Infections among Healthy Adults, Elderly and Children", Electronic Journal of General Medicine, Vol. 17, Issue 4, em202,2020. https://doi.org/10.29333/ejgm/7850

[4] D. Gondauri, E. Mikautadze, M. Batiashvili, "Research on COVID-19 Virus Spreading Statistics based on the Examples of the Cases from Different Countries", Electronic Journal of General Medicine, Vol. 17, Issue 4, em209, 2020. https://doi.org/10.29333/ejgm/7869

[5] M.L. Holshue, C. DeBolt, S. Lindquist, K.H. Lofy, J. Wiesman, "First case of 2019 novel coronavirus in the United States", N Engl J Med [epub ahead of print 31 Jan 2020] in press,2020. https://doi.org/10.1056/NEJMoa2001191

[6] W. Bao, "COVID-19 and online teaching in higher education: A case study of Peking University", Hum Behav & Emerg Tech., 2020, Vol. 1, Issue 3, 2020. https://doi.org/10.1002/hbe2.191

[7] E.J. Sintema, "Effect of COVID-19 on the Performance of Grade 12 Students: Implications for STEM Education", Eurasia Journal of Mathematics, Science and Technology Education, Vol. 16, Issue 7, em1851, 2020. https://doi.org/10.29333/ejmste/7893

[8] Z. Yan, "Unprecedented pandemic, unprecedented shift, and unprecedented opportunity", Hum Behav & Emerg Tech, 2020,1-3. https://doi.org/10.1002/hbe2.192

[9]"COVID-19 Educational Disruption and Response", UNESCO. Retrieved from https://en.unesco.org/covid19/educationresponse, 2020.

[10] T. Frieden, "Lessons from Ebola: The secret of successful epidemic response", CNN. https://edition.cnn.com/2020/03/11/health/coronavirus-lessons-from-ebola/index.html, 2020.

[11] A. Zumla, W. Yew, D.S. Hui, "Emerging Respiratory Infections in the 21st Century, An Issue of Infectious Disease Clinics", Vol. 24, Elsevier Health Sciences. pp. 614. ISBN 978-1-4557-0038-7,2010.

[12] S. Cauchemez, N.M. Ferguson, C. Wachtel, A. Tegnell, G. Saour, B. Duncan, A. Nicoll, "Closure of schools during influenza pandemic", The Lancet, Infectious Diseases, Vol 9, Issue 8, pp.473–81,2009. Doi:10.1016/S1473-3099(09)70176-8. PMC 7106429. PMID 19628172

[13] De Looper, Christian, "Google will begin shutting down the classic Hangouts app in October", DigitalTrends.com. Archived from the original on August 4, 2019. Retrieved September 5, 2019

[14] Boland, Hannah. "Google launches free version of Meet in bid to topple Zoom". The Telegraph. Retrieved 5 May 2020

[15] Kahn, Jordan, "Google Classroom now available to all Apps for Education users, adds collaboration features", August 12, 2014. 9to5Google. Retrieved April 28, 2017.

[16]https://spoken-tutorial.org/statistics/academic-center/8652/acropolis-institute-of-technology-and-research/